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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



Applicant: Hamberg

Serial No. TO BE ASSIGNED

Corresponding to PCT/FI99/00285, filed 6 April 1999

Filed: 3 April 1998 Docket No.: 602.331USW1

Title: IMPLEMENTING A TECHNICAL SOFTWARE APPLICATION IN A MOBILE COMMUNICATION SYSTEM

CERTIFICATE UNDER 37 C.F.R. 1.10:

'Express Mail' mailing number: EL492431243US

Date of Deposit: 27 September 2000

The undersigned hereby certifies that this Transmittal Letter and the paper or fee, as described herein, are being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

By: Jennifer Carey  
Jennifer Carey

Box Patent Application  
 Assistant Commissioner for Patents  
 Washington, D.C. 20231

**REQUEST FOR CONTINUATION OF AN INTERNATIONAL APPLICATION**  
**UNDER 37 C.F.R. §1.53(b)**

This is a request for filing a continuation application under 37 C.F.R. §1.53(b) of prior pending international application number PCT/FI99/00285 filed on 6 April 1999 entitled IMPLEMENTING A TECHNICAL SOFTWARE APPLICATION IN A MOBILE COMMUNICATION SYSTEM, which designated the United States.

1. ☒ Enclosed is a patent application containing 10 pages of specification, 4 pages of claims and 6sheet(s) of drawings.
2. ☒ A preliminary amendment is enclosed.
3. ☒ Please amend the specification by inserting the following paragraph after the title:

This application is a continuation of international application serial number PCT/FI99/00285, filed 6 April 1999.

4. ☐ Small entity status
  - a. ☐ A small entity statement is enclosed.
  - b. ☐ A small entity statement was filed in the prior non provisional application.
  - c. ☐ is no longer claimed.

The filing fee is calculated below

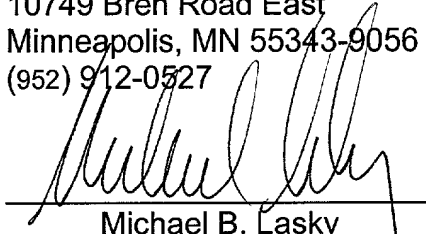
CLAIMS				
	Number Filed	Number Extra	Rate	Fee
Total Claims	19	0	X \$18.00	\$
Indep. Claims	2	0	X \$78.00	\$
Multiply Dependent Claims				\$
Basic Fee				\$ 690.00
TOTAL				\$ 690.00

5. ☒ Payment of filing fees  
☐ A check in the amount of \_\_\_\_\_ is enclosed.  
☐ Please charge Deposit Account Number 50-1038.  
☒ Is deferred.
6. ☒ The Commissioner is hereby authorized to credit any overpayment or charge any fees required under 37 C.F.R. §1.16-1.18 to Deposit Account Number 50-1038.
7. ☒ The priority of Finnish application number 980778, filed 3 April 1998, is claimed under 35 U.S.C. §119.  
☐ A certified copy of the priority application is enclosed.
8. ☒ An unsigned Declaration is enclosed.
9. ☐ An assignment of the invention to \_\_\_\_\_, Recordation Form Cover Sheet (Patents Only) and a check in the amount of \$40.
10. ☒ An Information Disclosure Statement, Form PTO 1449 and copies of 3 citations are enclosed.
11. ☒ Correspondence Address
- Altera Law Group  
10749 Bren Road East  
Minneapolis, Minnesota 55343
12. ☒ Address all correspondence to Michael B. Lasky.
13. ☐ Also enclosed:
14. ☒ A return postcard is enclosed.

Respectfully submitted,

ALTERA LAW GROUP, LLC  
10749 Bren Road East  
Minneapolis, MN 55343-9056  
(952) 912-0527

Dated: 27 September 2000

  
\_\_\_\_\_  
Michael B. Lasky  
Atty. Reg. Number 29,555  
MBL/mka

S/N UNKNOWN

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Hamberg Serial No.: UNKNOWN  
Filed: CONCURRENT HERewith Docket No.: 602.331USW1  
Title: IMPLEMENTING A TECHNICAL SOFTWARE APPLICATION IN A  
MOBILE COMMUNICATION SYSTEM

CERTIFICATE UNDER 37 CFR 1.10

'Express Mail' mailing label number: EL492431243US

Date of Deposit: 27 September 2000

I hereby certify that this correspondence is being deposited with the United States Postal Service 'Express Mail Post Office To Addressee' service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

By:

Name: Missy Lange

**PRELIMINARY AMENDMENT**

Box Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

Please enter the following preliminary amendment into the above-referenced application.

**ABSTRACT**

Please insert the attached abstract into the application as the last page thereof.

**CLAIMS**

Please amend the claims as follows:

In claim 3, lines 1-2, please replace "any one of claims 1 or 2" with --claim 1--.

In claim 4, lines 1-2, please replace "any one of claims 1-3" with --claim 1--.

In claim 5, lines 1-2, please replace "any one of claims 1-4" with --claim 1--.

In claim 6, lines 1-2, please replace "any one of claims 1-5" with --claim 1--.

In claim 7, lines 1-2, please replace "any one of claims 1-6" with --claim 1--.

In claim 8, lines 1-2, please replace "any one of claims 1-7" with --claim 1--.

In claim 9, lines 1-2, please replace "any one of claims 1-8" with --claim 1--.

In claim 10, lines 1-2, please replace "any one of claims 1-9" with --claim 1--.

In claim 13, line 1, please remove "or 12".

In claim 14, line 1, please replace "claims 11-13" with --claim 11--.

In claim 15, line 1, please replace "claims 11-14" with --claim 11--.

In claim 16, lines 1-2, please replace "any one of claims 11-15" with --claim 11--.

In claim 17, lines 1-2, please replace "any one of claims 11-16" with --claim 11--.

In claim 18, lines 1-2, please replace "any one of claims 11-17" with --claim 11--.

In claim 19, lines 1-2, please replace "any one of claims 11-18" with --claim 11--.

### **REMARKS**

The above preliminary amendment is made to insert an abstract page into the application and to remove multiple dependencies from the following claims: 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, and 19.

Applicant respectfully requests that this preliminary amendment be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicant's attorney of record, Michael B. Lasky at (952) 912-0527.

Respectfully submitted,

ALTERA LAW GROUP, LLC  
10749 Bren Road East  
Minneapolis, MN 55343-9056  
(952) 912-0527

Dated: 27 September 2000

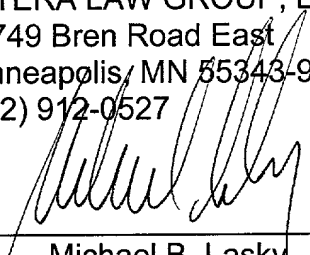
  
\_\_\_\_\_  
Michael B. Lasky  
Atty. Reg. Number 29,555  
MBL/mka

Figure 1 consists of 12 bar charts, labeled (a) through (l), each representing a different fish species. The y-axis for all charts is 'Percentage of total catch' ranging from 0 to 100. The x-axis for all charts is 'Year' from 1990 to 2001. The species and their corresponding data are as follows:

- (a) Atlantic croaker: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (b) Striped bass: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (c) Weakfish: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (d) Spot: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (e) Blue crab: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (f) Rockfish: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (g) Atlantic silverside: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (h) Atlantic herring: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (i) Atlantic menhaden: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (j) Atlantic tomcod: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (k) Atlantic bluefish: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).
- (l) Atlantic sharpnose shark: 1990 (10%), 1991 (10%), 1992 (10%), 1993 (10%), 1994 (10%), 1995 (10%), 1996 (10%), 1997 (10%), 1998 (10%), 1999 (10%), 2000 (10%), 2001 (10%).

Figure 1 consists of 12 bar charts, labeled (a) through (l), each representing a different demographic or attitudinal parameter. The y-axis for all charts is 'Percentage' ranging from 0 to 100. The x-axis for each chart lists the categories for that parameter.

- (a) Age:** Categories are 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85-94, 95-104.
- (b) Sex:** Categories are Male, Female.
- (c) Education:** Categories are No formal education, Primary, Secondary, Tertiary.
- (d) Income:** Categories are Less than 100,000, 100,000-200,000, 200,000-300,000, 300,000-400,000, 400,000-500,000, 500,000-600,000, 600,000-700,000, 700,000-800,000, 800,000-900,000, 900,000-1,000,000, More than 1,000,000.
- (e) Employment:** Categories are Unemployed, Self-employed, Employed.
- (f) Health status:** Categories are Good, Fair, Poor.
- (g) Access to health services:** Categories are Yes, No.
- (h) Knowledge of HIV/AIDS:** Categories are Yes, No.
- (i) Attitudes towards people with HIV/AIDS:** Categories are Good, Fair, Poor.
- (j) Stigma:** Categories are Yes, No.
- (k) Discrimination:** Categories are Yes, No.
- (l) Support from family and community:** Categories are Yes, No.

Figure 1 consists of 12 bar charts, labeled (a) through (l), each representing a different demographic or attitudinal parameter. The y-axis for all charts is 'Percentage' ranging from 0 to 100. The x-axis for each chart lists the categories for that parameter.

- (a) Age:** Categories are 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85-94, 95-104.
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- (c) Education:** Categories are No formal education, Primary, Secondary, Tertiary.
- (d) Income:** Categories are Less than 100,000, 100,000-200,000, 200,000-300,000, 300,000-400,000, 400,000-500,000, 500,000-600,000, 600,000-700,000, 700,000-800,000, 800,000-900,000, 900,000-1,000,000, More than 1,000,000.
- (e) Employment:** Categories are Unemployed, Self-employed, Employed.
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- (i) Attitudes towards people with HIV/AIDS:** Categories are Good, Fair, Poor.
- (j) Stigma:** Categories are Yes, No.
- (k) Discrimination:** Categories are Yes, No.
- (l) Support from family and community:** Categories are Yes, No.

## IMPLEMENTING A TECHNICAL SOFTWARE APPLICATION IN A MOBILE COMMUNICATION SYSTEM

The present invention relates to a procedure as defined in the preamble of claim 1 and to a system  
5 as defined in the preamble of claim 11 for implementing a technical application and eliminating uncontrolled internal interdependencies within the application.

In the design, production and management of  
10 industrial apparatus, projects, processes and software, difficulties are often caused by various uncontrolled or at least difficult-to-control internal interdependencies between different parts. In design and project management, internal interdependencies may  
15 arise e.g. when person A makes a plan Y for implementing a certain device or system. The plan Y is approved at a higher level C with certain corrections, whose implementation is delegated to person A except for a given detail, which is delegated to person B. Persons  
20 A and B are instructed to implement a solution they find best within the limitations specified by the higher level C. Thus, a change made by person B, in addition to affecting the final result, has an indirect effect on the decisions made by person A. Two interdependencies arise: 'X depends on A and B' and 'A  
25 depends on B'. Problems are encountered when C (or B) does not inform A about the changes made by B.

In the treatment of large assemblies containing a plurality of variables, C may not necessarily  
30 even remember to tell A that the latter's decisions are now also dependent on decisions made by B. Such a situation can be regarded as an interdependency that is uncontrolled or at least difficult to control. Corresponding interdependencies between variables can be  
35 found in industrial processes and computer software alike.

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In software development, models of the interdependencies between algorithms and databases have been created using various service definitions and interface descriptions. In creating models of such interdependencies, extensive use has been made of the client-server paradigm: A client utilises a service provided by a server in accordance with a defined interface. For example, in a situation where a server containing uncontrolled internal interdependencies serves a number of clients, a change made in the operation of the server to satisfy a given client may produce undesirable effects on operation provided for another client.

To eliminate interdependencies from databases, numerous methods have been developed. One of these is normalisation of databases, about which there are many theories published in literature. An appropriately normalised database does not contain any uncontrolled internal interdependencies; each relation always contains a key which specifies the data elements contained in the relation - if the key data for the relation indirectly or together with another data item determines an attribute of the relation, then the relation has to be divided into several relations. In this case, the key data for each relation unambiguously and alone determines the result data produced by the relation.

Normalisation of databases only applies to the retrieval of existing data on the basis of certain key data. For instance, the output parameter 3 for input parameters 1 and 2 in the addition operation  $1+2=3$  would be retrieved from a normalised database which contains the sums produced by all possible input parameters. This type of structure which covers every possible combination of input parameters would not be practical or even possible in large processes or software due to the size required for the structure, the

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storage space it would take up and the difficulty of its modification. On the other hand, the client-server paradigm does not reduce the problems resulting from indistinct interdependencies, nor does it answer the question of how to control them.

The object of the present invention is to create a procedure and system that will make it easier to control interdependencies between parts contained in an application. A specific object of the invention is to create a procedure and system which can be used to eliminate uncontrolled internal interdependencies between parts within a technical application.

As for the features characteristic of the procedure and system of the invention, reference is made to the claims.

Normalisation applied to databases can also be applied to the implementation of the above-mentioned technical applications. According to the invention, a normalised application and its parts do not contain any uncontrolled internal interdependencies, so the operation of the application and its parts is unambiguously predictable. When a part of an application functions unambiguously, the part can be considered as a "black box" in which given input data always produces the same output data corresponding to the input data. Furthermore, when the application consists of normalised parts, its operation is unambiguous and predictable. The strength of the invention is especially evident when changes are made in a normalised application - when a part within a normalised application in which all internal interdependencies are under control is modified, one can be sure that the change will not produce any indirect effect on some other function of the application.

An application implemented according to the invention comprises a number of parts or functional assemblies, a functional assembly comprises one or

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more elements and an element comprises an industrial procedure, apparatus, software solution and/or process. For input data, the application produces output data so that the output data produced in the elements by processing determine the output data of the functional assemblies. The output data of the functional assemblies further determine the output data of the application. According to the invention, the element is normalised so that the element does not contain any internal interdependencies and the input data of the element unambiguously and alone determines the output data of the element. The functional assembly determining the input data of an element comprises one or more normalised elements, which determine the output data of the functional assembly.

A functional assembly can be normalised in the same way as an element. When a normalised functional assembly is considered as a part of a larger application or another functional assembly, it appears as a "black box" whose operation is unambiguously predictable - for each input data item, there is an output data item, and the normalised functional assembly does not contain any uncontrolled internal interdependencies. It can be thought of as a normalised element for an application or another functional assembly. From normalised functional assemblies (or normalised elements), it is possible to build an application than does not contain any uncontrolled internal interdependencies.

In an embodiment of the procedure, a first set of elements according to the invention forms functional assemblies. These functional assemblies are further normalised, so they are seen by another functional assembly as normalised elements. An application according to the invention consists of one or more normalised functional assemblies, which unambiguously

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and alone determine the output data of the application.

Functional assemblies can be formed by making different combinations. A functional assembly may consist of one or more normalised elements according to union, projection and/or selection, where union joins two or more elements in parallel, projection selects one or more of a set of output data items produced by an element, and selection specifies the output data on the basis of the input data for the set. Further, functional assemblies can be formed by executing normalised elements in cascade, in which case the output data of one element forms the input data of another element and/or the output data of one element affects the input data of another element. Further, in the procedure of the invention, functional assemblies can be built by having elements executed conditionally, in which case, when a first normalised element produces a predetermined output, the input data for a second normalised element is determined, otherwise no input data for the second element is determined. Further, in the procedure of the invention, functional assemblies can be built by having elements executed repeatedly, in which case the number of repeated executions of a first element is determined by the output data of a second element.

The application in the procedure may be e.g. a telephone exchange software application, where a telephone number supplied as input data by a client produces a connected call as output data.

The system of the invention comprises means for implementing an application and for normalisation of the application. The means comprised in the system normalise the elements in the application so that the elements contain no uncontrolled internal interdependencies. From the elements, the means of the system form functional assemblies, which are also normalised.

The means of the system treat normalised functional assemblies like normalised elements. Proceeding in this manner, by normalising functional assemblies and combining normalised functional assemblies, the system  
5 creates an application which consists of one or more normalised functional assemblies. The finished application does not contain any uncontrolled internal interdependencies and the normalised functional assemblies forming it unambiguously and alone determine the  
10 output data of the application.

The system of the invention forms the functional assemblies from one or more normalised elements (or normalised functional assemblies) according to union, projection or selection, where union joins two or  
15 more elements in parallel, projection selects one or more of a set of output data items produced by an element, and selection specifies the output data on the basis of the input data for the set. Further, the system comprises means for forming functional assemblies  
20 from one or more normalised elements so that the elements can be executed in cascade, in which case the output data of one element forms the input data of another element and/or the output data of one element affects the input data of another element. Further,  
25 the system comprises means for forming a functional assembly from one or more normalised elements so that the elements can be executed conditionally, in which case, when a second normalised element produces a predetermined output, the input data for a first normalised element is determined, otherwise no input data  
30 for the first element is determined. Further, the system comprises means for forming a functional assembly from one or more normalised elements so that the elements can be executed repeatedly, in which case the  
35 number of repeated executions of a first element is determined by the output data of a second element.

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In the following, the invention will be described in detail by the aid of a few examples of its embodiments, wherein

Fig. 1 illustrates the normalisation of an application;

Fig. 2 presents an application consisting of normalised elements and functional assemblies formed from them;

Fig. 3 illustrates certain methods of building functional assemblies according to the invention; and

Fig. 4 represents a system according to the invention.

Fig. 1a represents an application 1 (route\_and\_charging\_analysis) in a mobile communication system. The application receives input data 2 (digits, tree and cha\_origin) and performs a search with this data, producing output data 3 (route and cha\_case). The application 1 comprises elements 5a, 5b, 5c and 5d.

Fig. 1b presents the application 1 in Fig. 1a as normalised functional assemblies 4b and 4c, where functional assembly 4b performs a search with input data 2b (digits, tree), producing output data 3b (route), and functional assembly 4c performs a search with input data 2c (route, cha\_origin) producing output data 3c (cha\_case). Functional assembly 4b consists of elements 5a and 5b and selection 10. Functional assembly 4c consists of elements 5c and 5d.

In Fig. 1c, an application 1 has been formed which uses input data 2 (digits, subs\_index) to establish a call, i.e. to produce output data 3 (connection). The application 1 consists of normalised functional assemblies 4a, 4b, 4c, 4d and 4e, where functional assemblies 4b and 4c are the normalised functional assemblies presented in Fig. 1b.

- Route depends on digits and tree; and
- Cha\_case depends on cha\_origin and route.

The application 1 in Fig. 2 receives input data 2, from which it processes output data 3. The application 1 contains a normalised functional assembly 4, which consists of four normalised elements 5a, 5b, 5c, 5d. The normalised functional assembly is also an element, so in this case normalised functional assembly 4 is an element to application 1. Further, functional assembly 4 sees the application 1 as a functional assembly. Element 5d is a normalised functional assembly which consists of normalised functional assembly (i.e. element) 6. Normalised functional assembly 6 may further consist of one or more normalised functional assemblies 7. In this way, it is possible to build an application (1) from which uncontrolled internal interdependencies have been eliminated. The search required to produce the output data 3 of the application 1 is not performed as a database search, but the output data is produced via algorithmic processing. In search for the output data 3, the input data 1 is chopped into parts and distributed further to normalised functional assembly 4. The essential point is that the input data 2 is divided into parts that are so small that the input data supplied to the elements 5a-5c will unambiguously determine their out-

put data. The input data for element 5d is further chopped in functional assemblies 6 and 7 until an unambiguous dependency is achieved. Functional assembly 7 may be e.g. a normalised measuring device.

5           The application 1 in Fig. 3 receives input data 2, from which it processes output data 3. The application 1 consists of functional assemblies 4 and 6, which consist of elements 5a, 5b, 5c, 5d, 5e and 5f. Functional assembly 4 comprises six elements 5a-5f, from which, using projection 9 and selection 10, a set of three elements 5a, 5b and 5c is formed, which processes output data 11, producing the input data for functional assembly 6. Functional assembly 6 further processes the data, producing the output data 3 of the application 1. To form the application 1 from functional assemblies 4 and 6, operations as used in relational databases are utilised. The operations used are union 8, projection 9 and selection 10, where union 8 joins three elements 5a, 5b and 5c in parallel, projection 9 selects a set of elements 5a, 5b and 5c from among elements 5a-5f, and selection 10 specifies the output data 11 based on the input data 2 supplied to the set. Further, functional assemblies 4 and 6 can be executed in cascade, in which case the output data 11 of functional assembly 4 forms the input data 12 supplied to a second functional assembly 6. Cascaded execution of functional assemblies 4 and 6 may also be conditional, in which case, if predetermined output data is produced by a first functional assembly 4, then input data 12 for a second normalised functional assembly 6 is determined, otherwise no input data 12 for functional assembly 6 is determined. Execution of functional assemblies may also be repeated, in which case the output data 11 of the first functional assembly 4 determines the number of repeated executions of the second functional assembly 6.

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In the database, all data has been stored beforehand, and it is there in a static form, in tables. The search for output data in the database is continued until a parameter corresponding to two input data  
5 items is found. In the procedure of the invention, no output data exists until it is searched for, and the output data searched for is produced by processing. Processing and various control flows distinguish an application implemented according to the invention  
10 from a database.

The system in Fig. 4 comprises means 13 for normalisation (element 5b) of element 17. Further, the system comprises means 14 for forming functional assemblies 4a from one or more normalised elements 5b.  
15 Moreover, the system comprises means 15 for normalising functional assemblies 4b and means 16 for composing an application 1 from normalised functional assemblies.

The invention is not restricted to the examples of its embodiments described above, but many variations are possible within the scope of the inventive idea defined in the claims.  
20

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## CLAIMS

1. Procedure for implementing an application and eliminating uncontrolled internal interdependencies within the application, in which the application comprises a number of functional assemblies and a functional assembly comprises one or more elements, said element comprising an industrial procedure, device, software solution and/or process, said application producing output data from input data so that the element output data obtained from the elements determine the output data of the functional assemblies, said output data of functional assemblies determining the output data of the application, wherein there are interdependencies formed between elements and/or functional assemblies, characterised in that the element is normalised so that uncontrolled internal interdependencies within the element are eliminated and the input data supplied to the element unambiguously and alone determines the output data produced by the element.

2. Procedure as defined in claim 1, characterised in that the functional assembly comprises one or more normalised elements, which determine the output data of the functional assembly.

3. Procedure as defined in any one of claims 1 or 2, characterised in that there are one or more functional assemblies and the functional assembly is normalised.

4. Procedure as defined in any one of claims 1 - 3, characterised in that the normalised functional assembly is a normalised element.

5. Procedure as defined in any one of claims 1 - 4, characterised in that the application consists of one or more normalised functional assemblies, which unambiguously and alone determine the output data of the application.



6. Procedure as defined in any one of claims  
1 - 5, characterised in that the functional  
assembly consists of one or more normalised elements  
according to union, projection and/or selection, where  
5 union joins two or more elements in parallel, projec-  
tion selects one or more of the output data items of  
the element, and selection specifies the output data  
on the basis of the input data of the set.

7. Procedure as defined in any one of claims  
10 1 - 6, characterised in that normalised ele-  
ments are executed in cascade, so that the output data  
of one element forms the input data of another element  
and/or the output data of one element affects the in-  
put data of another element.

15 8. Procedure as defined in any one of claims  
1 - 7, characterised in that normalised ele-  
ments are executed conditionally, so that when a sec-  
ond normalised element produces predetermined output  
data, input data for a first normalised element is de-  
20 termined, otherwise no input data for the first ele-  
ment is determined.

9. Procedure as defined in any one of claims  
1 - 8, characterised in that the normalised  
element can be executed repeatedly, the number of re-  
25 peated executions of a first element being determined  
by the output data of a second element.

10. Procedure as defined in any one of claims  
1 - 9, characterised in that the application  
is a telephone exchange software application in a mo-  
30 bile communication system.

11. System for implementing an application  
and eliminating uncontrolled internal interdependen-  
cies within the application, wherein the application  
comprises a number of functional assemblies and the  
35 functional assembly comprises one or more elements,  
the element comprising an industrial procedure, de-  
vice, software application and/or process and produc-

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ing output data from input data so that the output data processed in the elements determines the output data of the functional assemblies, the output data of the functional assemblies determining the output data of the application, and in which system there are interdependencies formed between elements and/or functional assemblies, characterised in that the system comprises means (13) for normalising (5b) one or more elements (17) so that uncontrolled internal interdependencies within the element (5b) are eliminated and the input data supplied to the element (5b) unambiguously and alone determines its output data.

12. System as defined in claim 11, characterised in that the system comprises means (14) for forming one or more functional assemblies (4a) so that the functional assembly (4a) comprises one or more normalised elements (5b).

13. System as defined in claim 11 or 12, characterised in that the system comprises means (15) for normalisation (4b) of the functional assembly (4a).

14. System as defined in claims 11 - 13, characterised in that the system comprises means (16) which treat the normalised functional assembly (4b) like a normalised element (5b).

15. System as defined in claims 11 - 14, characterised in that the system comprises means (16) for forming an application (1) so that the application (1) consists of one or more normalised functional assemblies (4b), which unambiguously and alone determine the output data of the application.

16. System as defined in any one of claims 11 - 15, characterised in that the system comprises means (14) for forming a functional assembly (4a) from one or more normalised elements (5b) according to union, projection and/or selection, where union joins two or more elements in parallel, projection se-

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17. System as defined in any one of claims 11  
5 - 16, characterised in that the system comprises means (14) for forming a functional assembly (4a) from one or more normalised elements (5b) so that elements can be executed in cascade and the output data of one element forms the input data for another  
10 element and/or the output data of one element affects the input data of another element.

19. System as defined in any one of claims 11 - 18, characterised in that the system comprises means (14) for forming a functional assembly from one or more normalised elements (5b) so that elements can be executed repeatedly, the number of executions of a first element being determined by the output data of a second element.

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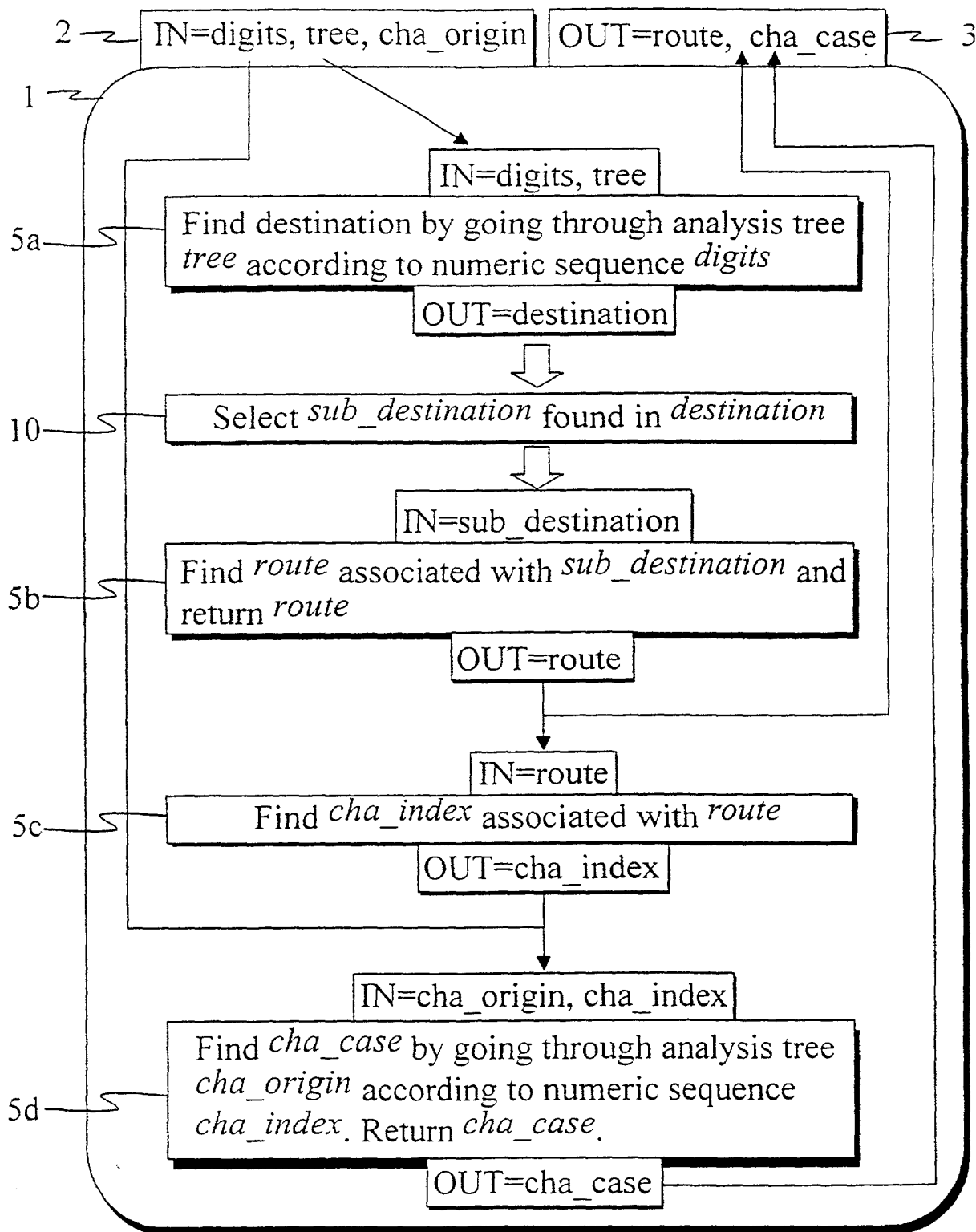


Fig 1a

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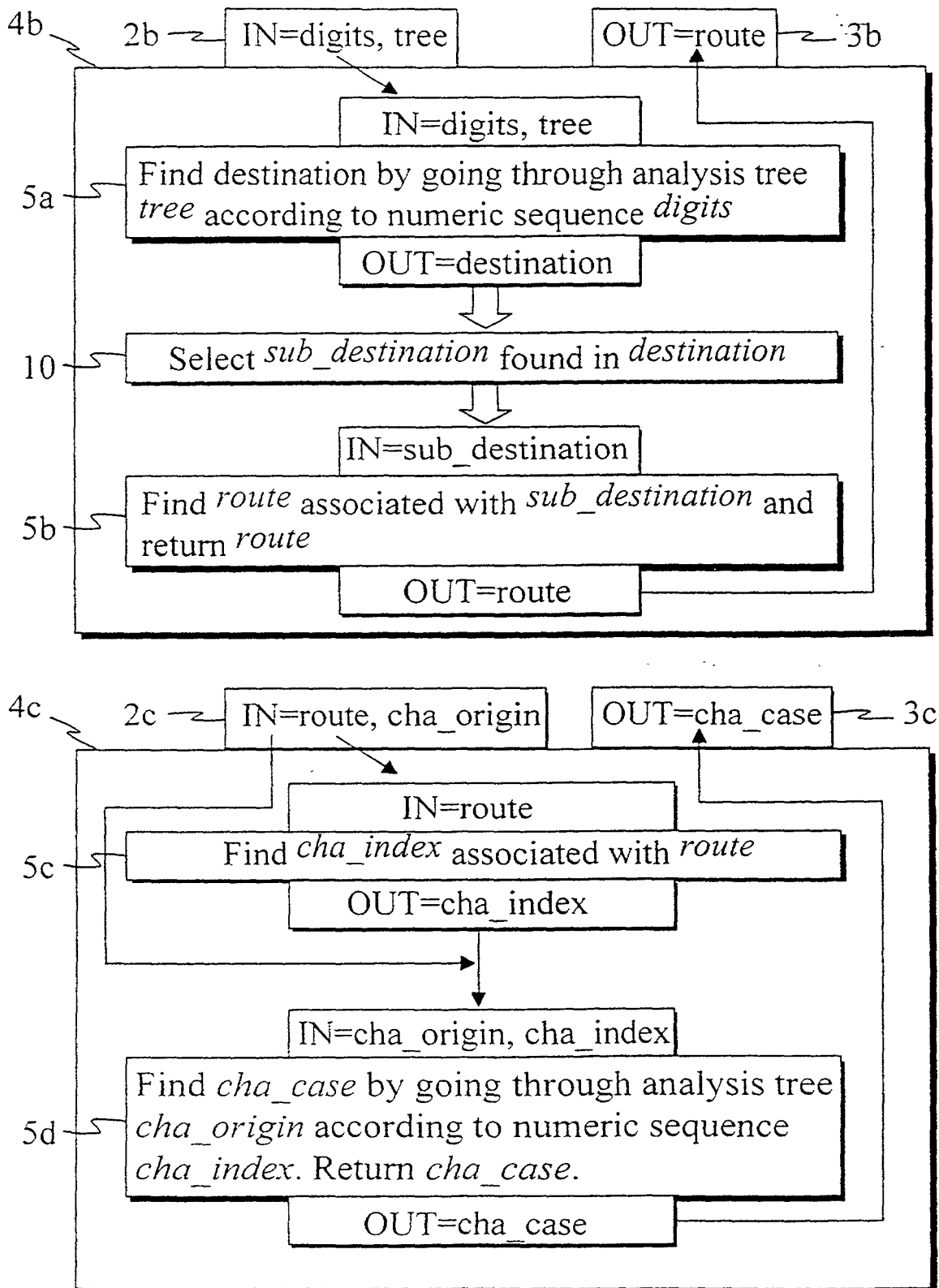


Fig 1b

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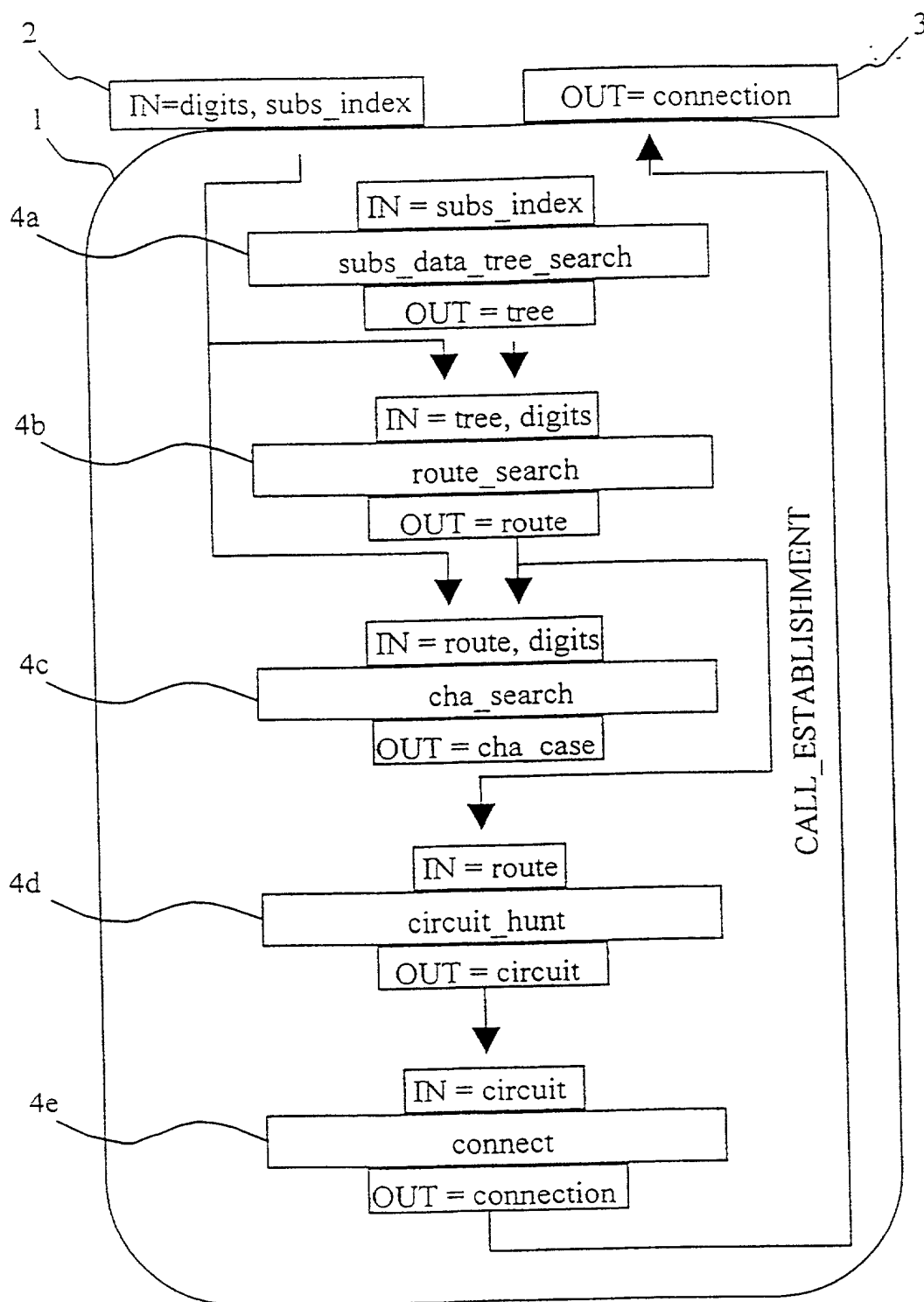


Fig 1c

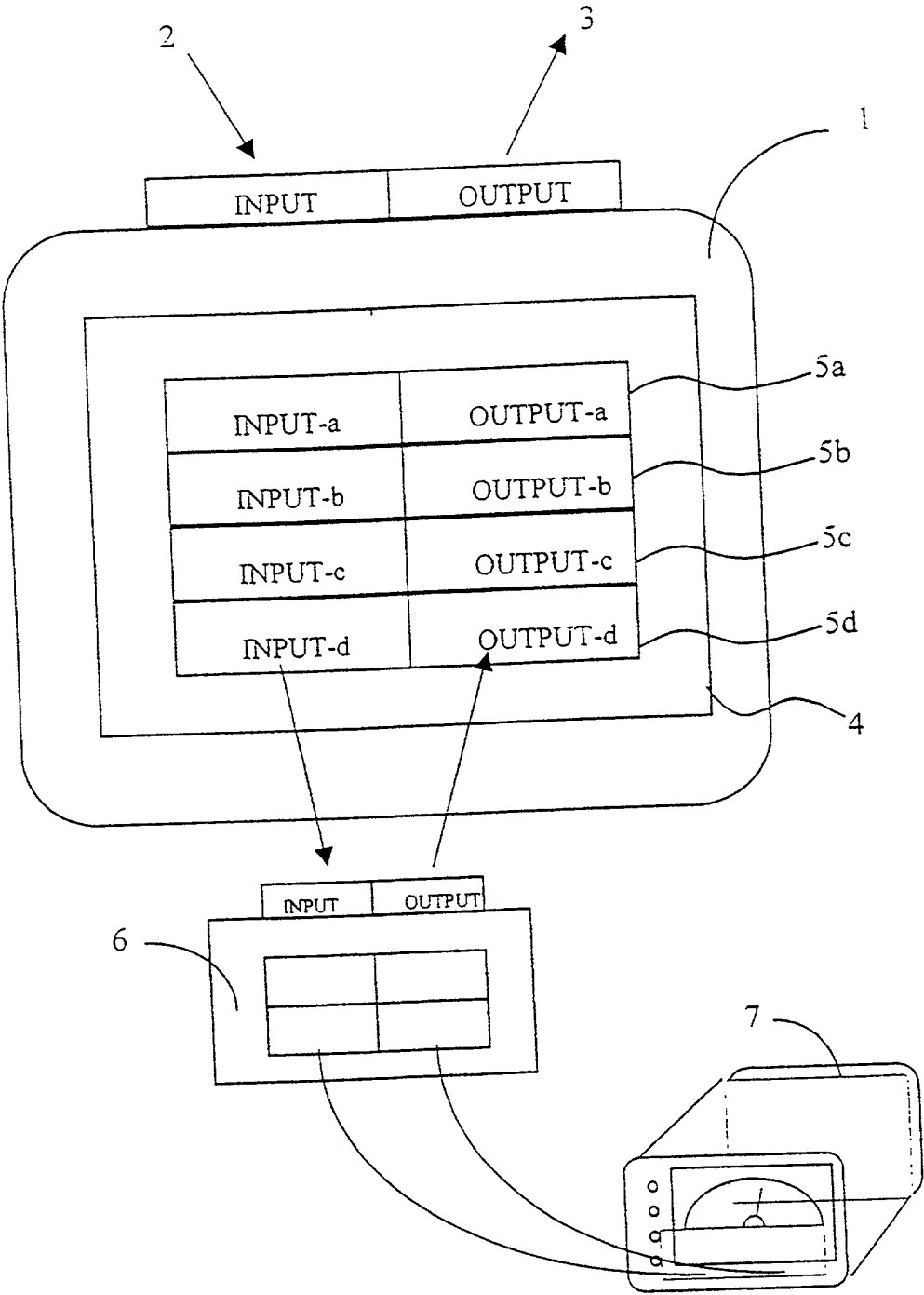


Fig 2

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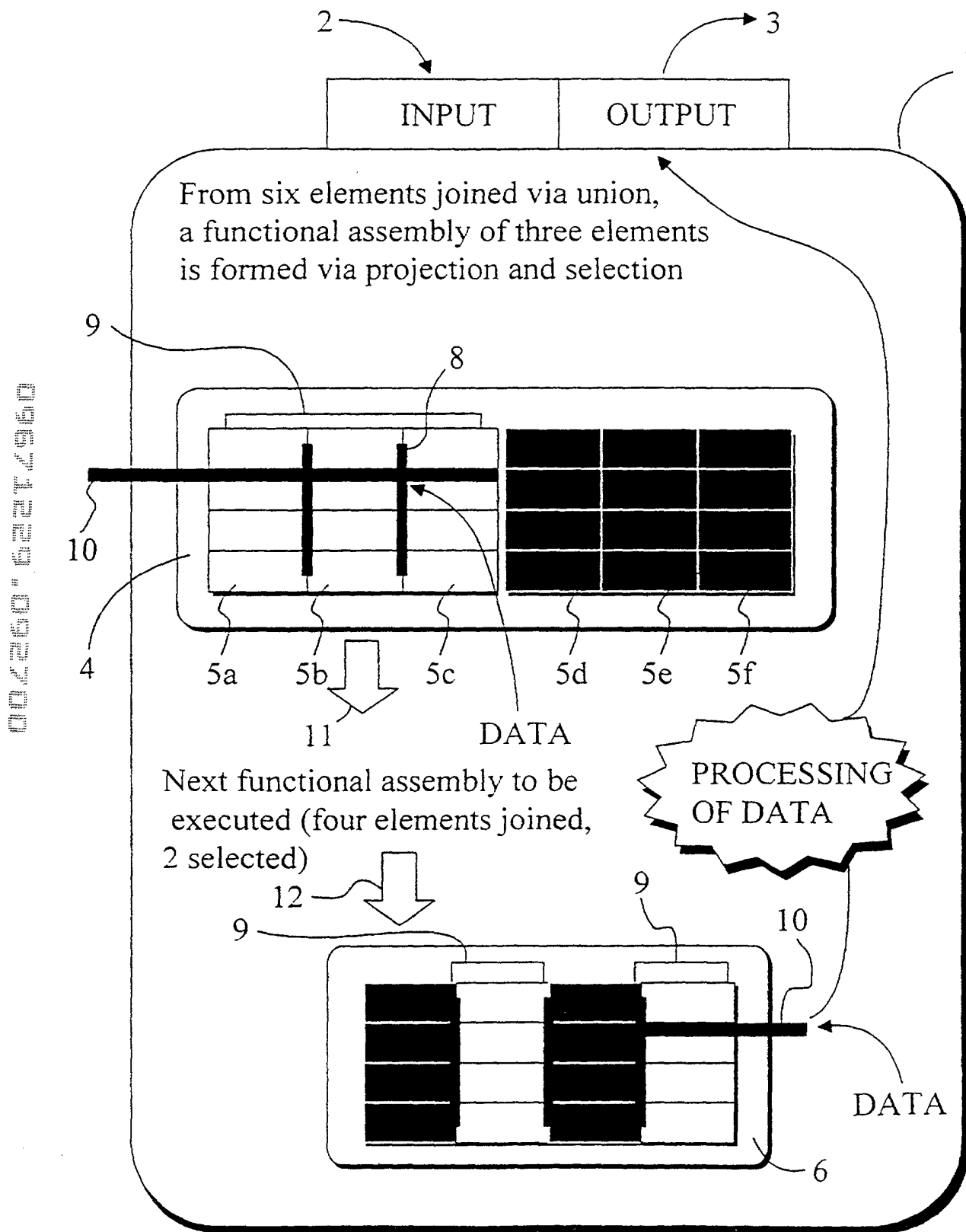


Fig 3



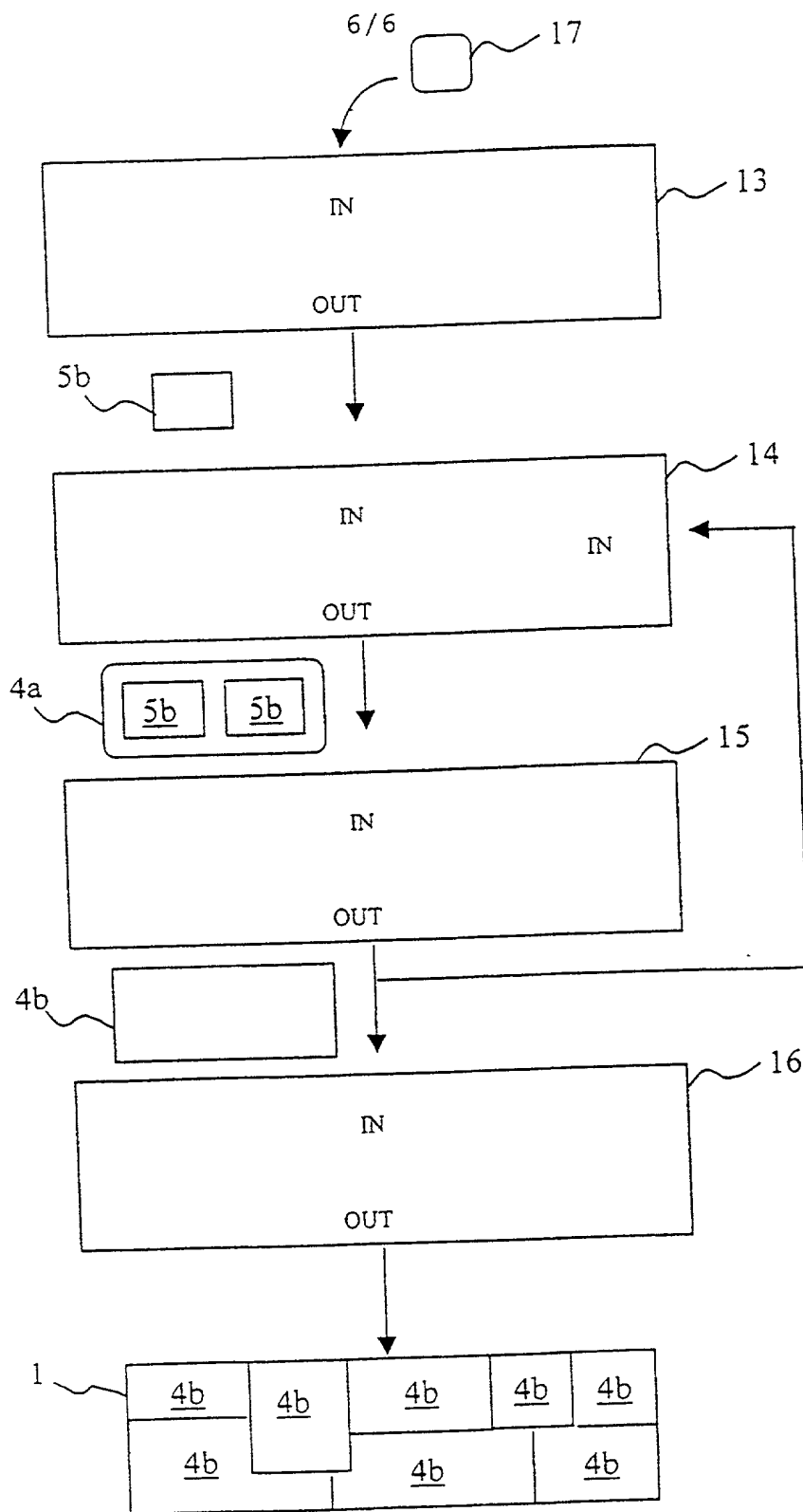


Fig 4

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**Altera Law Group, LLC****Declaration and Power of Attorney Patent Application  
(Design or Utility)**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:  
**IMPLEMENTING A TECHNICAL SOFTWARE APPLICATION IN A MOBILE COMMUNICATION SYSTEM**

the specification of which

- ☐ is referred to by Altera reference number on a separate document  
☒ is attached hereto  
☐ was filed on 27 September 2000 as application serial no. \_\_\_\_\_  
 and or PCT International Application number \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information know to me to be material to patentability as defined in 37 C.F.R. §1.56.

I hereby claim foreign priority benefits under 35 U.S.C. §119(a)-(d) or 35 U.S.C. §365(b) of any foreign application(s) for patent or inventor's certificate, or 35 U.S.C. §365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate of PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)		
Number 980778	Country Finland	Day/Month/Year Filed 3 April 1998
Number	Country	Day/Month/Year Filed
Number	Country	Day/Month/Year Filed

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I hereby claim the benefit under 35 U.S.C. §119(e) of any United States provisional application(s) listed below:

Prior Provisional Application(s)	
Serial Number	Day/Month/Year Filing Date
Serial Number	Day/Month/Year Filing Date
Serial Number	Day/Month/Year Filing Date

I hereby claim the benefit under 35 U.S.C. §120 of any United States application(s), or under 35 U.S.C. §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. §112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 C.F.R. §1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

Prior U.S. or International Application(s)		
Serial Number PCT/FI99/00285	Day/Month/Year Filed 6 April 1999	Status (patented, pending, abandoned) Pending
Serial Number	Day/Month/Year Filed	Status (patented, pending, abandoned)
Serial Number	Day/Month/Year Filed	Status (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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## Power of Attorney

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Steven R. Funk	Reg. No. 37,830
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Karen D. McDaniel	Reg. No. 37,674

Mark A. Hollingsworth	Reg. No. 38,491
Michael B. Lasky	Reg. No. 29,555
Iain A. McIntyre	Reg. No. 40,337

I hereby authorize them or others whom they may appoint to act and rely on instructions from and communicate directly with the person/organization who/which first sends this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct Altera Law Group, LLC otherwise.

Please direct all correspondence in this case to Altera Law Group, LLC at the address indicated below:

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Signature of Inventor		Date